

**Citation:**

Priebe MG, van Binsbergen JJ, de Vos R, Vonk RJ. Whole grain foods for the prevention of type 2 diabetes mellitus. *Cochrane Database Syst Rev*. 2008 Jan 23;(1):CD006061.

**PubMed ID:** [18254091](#)

**Study Design:**

Systematic Review

**Class:**

M - [Click here](#) for explanation of classification scheme.

**Research Design and Implementation Rating:**

POSITIVE: See Research Design and Implementation Criteria Checklist below.

**Research Purpose:**

The objective was to assess the effects of whole-grain foods for the prevention of T2DM.

**Inclusion Criteria:**

CENTRAL, MEDLINE, EMBASE, CINAHL and AMED were searched. Cohort studies were selected with a minimum duration of five years that assessed the association between intake of whole-grain foods or cereal fiber and incidence of T2DM. Randomized controlled trials lasting at least 6 weeks were selected that assessed the effect on T2DM and its major risk factors of a diet rich in whole-grain foods compared to a diet rich in refined grain foods.

**Exclusion Criteria:****Description of Study Protocol:**

Two authors independently selected the studies, assessed quality and extracted data.

In addition to the database searches, a hand search was conducted to review reference lists of all included studies. Authors were contacted for additional unpublished study information as needed.

Criteria for study inclusion and quality criteria were determined in advance and applied by both reviewers.

Data of studies were not pooled because of methodological diversity.

**Data Collection Summary:**

Criteria for considering studies for this review included:

subject inclusion (healthy persons with at least one major risk factor for T2DM, excluding those <18 years of age) and use of currently valid diagnostic criteria,

use of standard measures of weight, obesity, and insulin resistance,

studies which compared diets rich in whole grain foods with diets rich in refined grain foods,

primary outcome defined as incidence of T2DM or changes in major risk factors such as impaired glucose tolerance, insulin resistance and overweight,

and prospective studies had to have a minimum duration of five years.

### **Description of Actual Data Sample:**

Out of 5,804 studies which were screened, the full texts of 23 studies were obtained. After detailed examination, 11 of these studies were excluded, leaving 12 studies that met inclusion criteria.

One randomized controlled trial and eleven prospective cohort studies were identified for inclusion.

RCT: N=12 overweight or obese, hyperinsulemia adults

Cohort studies: Duration from 6-12 years; participants were without previous diagnosis of diabetes, ages from 14 to 75, various races, and both sexes in varying numbers; N's from a low of 4,316 to over 10,000.

### **Summary of Results:**

#### **Key Findings**

One randomized controlled trial, of low methodological quality, reported the change in insulin sensitivity in 12 obese hyperinsulinemic participants after six-week long interventions. Intake of whole grain foods resulted in a slight improvement of insulin sensitivity and no adverse effects.

Four of the eleven cohort studies measured cereal fiber intake, three studies whole grain intake and two studies both. Two studies measured the change in whole grain food intake and one of them also change in cereal fiber intake. The incidence of T2DM was assessed in nine studies and changes in weight gain in two studies. The prospective studies consistently showed a reduced risk for high intake of whole grain foods (27% to 30%) or cereal fiber (28% to 37%) on the development of T2DM.

### **Author Conclusion:**

The RCT has a risk of bias since blinding was not stated and the randomization procedure was not described, as well as having a small sample.

While the results of the cohort studies were homogenous, evidence from only prospective cohort trials is considered to be too weak to be able to draw a definite conclusion about the effect of whole grain foods on the development of T2DM.

Properly designed long-term randomized controlled trials are needed.

**Reviewer Comments:**

**Research Design and Implementation Criteria Checklist: Review Articles**

**Relevance Questions**

- |    |   |     |
|----|---|-----|
| 1. | Will the answer if true, have a direct bearing on the health of patients?                       | Yes |
| 2. | Is the outcome or topic something that patients/clients/population groups would care about?     | Yes |
| 3. | Is the problem addressed in the review one that is relevant to nutrition or dietetics practice? | Yes |
| 4. | Will the information, if true, require a change in practice?                                    | Yes |

**Validity Questions**

- |     |  |     |
|-----|--|-----|
| 1.  | Was the question for the review clearly focused and appropriate?   | Yes |
| 2.  | Was the search strategy used to locate relevant studies comprehensive? Were the databases searched and the search terms used described?  | Yes |
| 3.  | Were explicit methods used to select studies to include in the review? Were inclusion/exclusion criteria specified and appropriate? Were selection methods unbiased?   | Yes |
| 4.  | Was there an appraisal of the quality and validity of studies included in the review? Were appraisal methods specified, appropriate, and reproducible?   | Yes |
| 5.  | Were specific treatments/interventions/exposures described? Were treatments similar enough to be combined?   | Yes |
| 6.  | Was the outcome of interest clearly indicated? Were other potential harms and benefits considered?   | Yes |
| 7.  | Were processes for data abstraction, synthesis, and analysis described? Were they applied consistently across studies and groups? Was there appropriate use of qualitative and/or quantitative synthesis? Was variation in findings among studies analyzed? Were heterogeneity issues considered? If data from studies were aggregated for meta-analysis, was the procedure described? | Yes |
| 8.  | Are the results clearly presented in narrative and/or quantitative terms? If summary statistics are used, are levels of significance and/or confidence intervals included?   | Yes |
| 9.  | Are conclusions supported by results with biases and limitations taken into consideration? Are limitations of the review identified and discussed?   | Yes |
| 10. | Was bias due to the review's funding or sponsorship unlikely?  | Yes |

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